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CULTIVATION OF THE GRAPE VINE

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CULTIVATION OF THE GRAPE VINE.

Of all fruit-plants, the Vine alone is the surest to produce a crop each year. It begins to yield in the second or third year from planting and, thereafter and up to the limit of its capacity, bears annually in increasing quantity. With ordinary care it lives for many years,—often, even for more than a life-time,—and it is in the experience of its cultivators that while the vine is one of the most paying of crops it is also among the more easily cultivated.

CLIMATE.

Although the vine has been grown for centuries in some of the most inclement climates of the world and may be cultivated even with a good deal of profit over a very wide range of temperature, it detests stagnation in the air or soil and shows a great preference for a warm, dry climate. It is a plant with a distinct period of growth and a distinct period of rest and though, throughout the growing period, it demands considerable moisture at the roots and will stand a moderate amount of rain, heavy rainfall is ruinous to its growth and is particularly disastrous to the fruit if it fall when the latter is swelling to ripen.

SITUATION.

The vine revels in a warm sunny situation and thrives only when it is fully exposed to heat, light and free currents of air. In the low country, dry situations on the banks of rivers and streams and the margins of *Ins* or fresh-water lakes and, in the hills, high land with a sunny southern exposure or sloping land about rivers and lakes with southern or even northern exposures are likely to suit the requirements of its cultivation.

SOIL.

It is not fastidious in regard to soil, being easy to grow and doing well on almost any average garden soil which is deep, drained and well cultivated. Open, porous, clayey or gravelly loams or alluvial loams with a good proportion of clay are suited for its cultivation, though the best vine-soils are deep free loams which are well drained and contain an abundance of lime. Lime in the soil is very essential for its best growth and highest production. The worst soils are cold water-logged clays, peat, and sand without consistence.

CULTIVATION.

1. *Methods of Propagation.*—The vine may be grown from seed, cuttings, layers or grafts. Propagation by seed is seldom practised because, like most fruit-plants, the vine is unknown to "come true to seed," the off-spring, as a rule, revealing features which are distinct from those of the parent-plant and usually more or less deterioration. Grafting is useful for the perpetuation of new, rare or valuable varieties, for strengthening weak vines, renewing old ones, and rendering delicate varieties immune to disease. The more usual means of propagation are (*a*) cuttings and (*b*) layers.

Cuttings are sections of the cane (young branch) made during the period of rest—when the leaves have dropped and the buds are dormant (not swelled or growing). Well-matured wood of the *present season's growth*, which usually furnishes the best cuttings, should be taken from vines in perfect health and in good bearing condition. Good yielders among local varieties, if available, are generally the best to select from; while, the introduction of foreign varieties will usually need much time for acclimatization and be largely experimental. A cutting may consist of a single joint (Fig. 1, *a*) with an inch or two of the cane on each side of it or it may have two or even three joints. A cutting with two joints (Fig. 1, *b*) is generally the best. In such a cutting, the cut at the lower end is made just below the joint and that at the upper an inch or two above the joint. A sharp thin-edged knife should be used and the cuts be made perfectly clean. The cuttings may be set two to four inches apart, each at an angle of about thirty degrees, in loose, rich, well-prepared soil, thrown into beds or shallow trenches (Fig. 2). The rows of cuttings may be three to four feet apart. The resultant plants, which should be watered by hand or irrigation-channels so as to keep the soil moist but not drenched, will be ready for planting out on the field by the end of the year in which they are sprouted or in the early part of the ensuing year. Propagation by cuttings is the simplest and most common of the methods in vogue with the vine but it is less certain in its results than the somewhat more difficult method of layering; for, even with the greatest of care and attention, some at least of the cuttings are likely to fail. It is therefore not only safe but necessary that at least three times as many cuttings should be set as the number of plants which will be ultimately required for the complete stocking of the area to be planted and for the repairing of blanks caused by failures on the field.

Layering consists in selecting canes or shoots from wood of the *previous season's growth* so near the ground at the base of the vine as to admit of their being conveniently laid in shallow trenches prepared to receive them. The trenches are 2 to 3 inches deep and the canes are carefully bent down into them after removing the buds which they bear on the arches between the stem of the vine and the soil. The canes may be either pinned or weighted down and their free ends tied on to stakes (Fig. 3) or not. The trench is kept moist by careful watering. In due course, shoots and roots are given out from each of the joints in contact with the soil. When the shoots are 6 to 12 inches high, the trenches may be filled in with good soil and firmed down (Fig. 4). In the following year, early in the growing

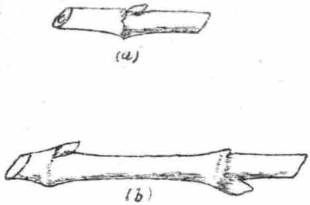

Fig. 1

(a) Cutting with one joint bearing a single eye or bud
(b) Cutting with two joints and eyes.

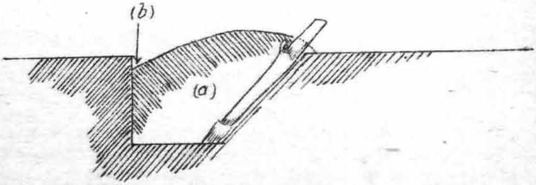

Fig. 2

Section of trench showing cutting in situ.
(a) is the prepared soil thrown into the trench and pressed down to keep the cutting in position ; the trench is watered at (b).

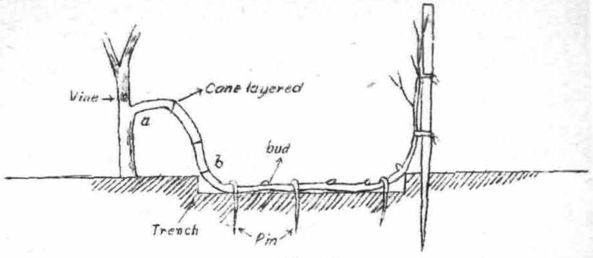

Fig. 3

A cane bent down from a vine and layered, pinned and staked, the buds between (a) and (b) have been removed.

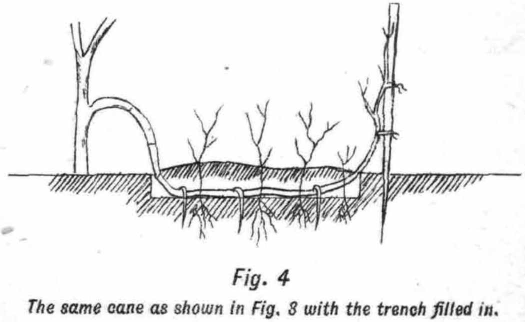

Fig. 4

The same cane as shown in Fig. 3 with the trench filled in.

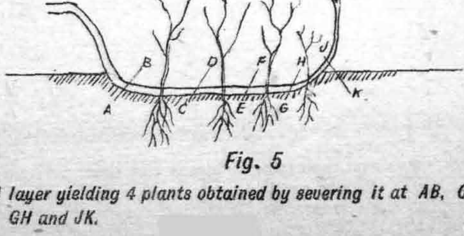

Fig. 5

A layer yielding 4 plants obtained by severing it at AB, CD, EF. GH and JK.

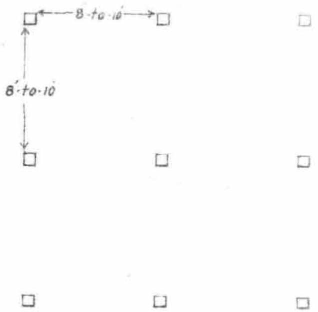

Fig. 6

The small squares are the pits.

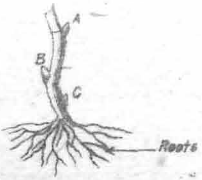

Fig. 7

Young vine pruned for planting, with 3 eyes A, B, C, retained.

season, the layers are unearthed and, being severed on the internodes between the joints, furnish as many plants as they had joints (Fig. 5). These plants are then planted out on the field.

2. *Planting.*—The young vines may be one or two years old at the time of planting them out. Usually, however, strong one-year-old plants with abundance of roots are preferred for planting. The following points need attention in the actual planting itself:—

(*a*) The pits should be at least 3 feet by 3 feet by 3 feet and completely filled in with the finest soil free from stones, wood and rubbish. They should be made at distances of 8 to 10 feet apart both in the lines and between them, so that an acre will hold from 680 to 435 plants (*vide* Fig. 6).

(*b*) Each plant, whatever its size, should have its canes cut down each to 2 or 3 eyes (buds) from the base and its roots shortened to about a foot in length (*vide* Fig. 7).

(*c*) The soil should be carefully worked about the roots, which should be spread out and placed at least 6 inches below the surface, and thoroughly well firmed down with the feet.

(*d*) In severe locations and gravelly soils, to prevent root-killing, the roots should be set at least 12 inches deeper in the pits than the depth at which they stood in the nursery beds.

(*e*) The plants should be watered by hand or by irrigation, slightly at first but more freely on striking root.

3. *Tillage.*—Soon after planting the vines and subsequently, at the commencement of each active period of growth, plough the field thoroughly from end to end to keep the roots from coming too near the soil surface. Follow this by frequent shallow cultivation throughout the growing season of the vine and especially after rain or irrigation as soon as the soil can be conveniently worked. A hoed secondary crop or a cover-crop may be grown among the vines until the latter begin to be fruitful when, whatever the profit obtained from such a crop, its cultivation should be discontinued. After bearing begins the soil should be kept clean and mellow by constant cultivation. A cover-crop may, if the soil be very poor and subject to excessive insolation or erosion by rain, be grown on the land to protect its surface. This crop may consist of one or other of the various peas and beans which are at present wild or cultivated in Burma and should be sown broadcast at the commencement of the rainy season and ploughed into the soil when in full leaf. At no time should the cover crop be permitted to get on to the soil which lies over the roots of the vines themselves.

4. *Irrigation.*—A water-supply available for use as desired is an element of great value as an assurance of safety. An ample moisture-supply is essential but an excess of it is directly injurious. Vines, if well planted when dormant, make a fine growth and continue it during the early period of the dry weather but suffer and often perish as the dry season advances because of the dryness and heating of the soil. It is therefore always safe to give an occasional watering throughout the dry period of the year and cultivate freely to break up the soil-surface as soon as possible after each watering. The behaviour of the plants is the only true guide to the degree and frequency of the

watering; but, as a rule, water should given long before the urgency for it is indicated by flaccidity or other signs of weakness in the plants. This can be known only by experience gained by close and constant observation. A good watering after the fruits have set and its withholdment as they approach ripeness would be conducive of much benefit. Water may be let on the field so as to circulate over it slowly by meandering in shallow channels between the plants (Fig. 8) or it may be run into one or more channels which communicate with circular trenches around them (Fig. 9).

5. *Manuring.*—The principle underlying the manurial treatment of the vine is that it should be encouraged to make only a moderate amount of growth each season, so that stimulating fertilisers are not required. It does best without much nitrogenous manure; indeed, too much organic or other nitrogenous manure tends to produce excessive leaf-growth and spongy wood with long and brittle internodes. Its needs are for moderate quantities of potash, phosphoric acid and cover crops. But on very poor gravelly soils and for exceptionally weak plants manures may be always used with advantage. Unleached wood-ashes, at the rate of about half a bushel per plant, applied at the commencement of the growing period, is one of the best fertilisers for the vine; or 3 pounds per plant of the following mixture may be applied with much benefit:—

Acid phosphate	...	...	90 pounds
Kainit ...	...	...	90 „
Cotton-seed Meal	...	...	20 „

6. *Pruning and Training.*—*Training* is the arrangement of the stem and branches of a vine and varies with the method of pruning which is adopted. *Pruning* is the periodic cutting back or shortening of the branches in order to curtail excessive wood-growth and, by arresting and guiding the flow of sap into the buds which are retained, to induce these to produce fruits. Only the simplest method of pruning and training will be described in this Bulletin. It has been already indicated (*vide* 2 *Planting*) that when a young vine is planted out on the field, all its canes should be cut back to 2 to 3 eyes or buds near the base (Fig. 7). In the ensuing season, these buds will grow out into canes of which, at the next pruning, all but the strongest should, in their turn, be removed (Fig. 10). The cane which is left, when long enough, is tied on to a horizontal wire, wooden batten or bamboo stretched across two hard-wood vertical posts which are put down at equal distances from the plant (Fig. 11). The posts should be long enough when sunk to stand about 5 feet above the ground. When the top of the vine reaches the wire, it is bent to one side, tied on between the joints and made to follow a half of the wire (Fig. 11). As growth proceeds, a bud near the bent part of the "head" of the vine may be likewise trained to grow on and follow the other half of the wire to which it, too, is tied on (Fig. 12). Thus, very soon the vine would assume the form of a more or less T-shaped plant with a short erect stem (18 to 20 inches high) and two transverse arms reaching 4 to 5 feet in length (Fig. 12). A bud is borne at each of the joints on the arms and from these are given out the canes of the season (Fig. 13). These canes are the fruiting canes which, when long

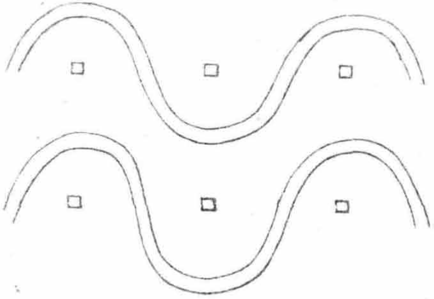

Fig. 8

Meandering water channels.

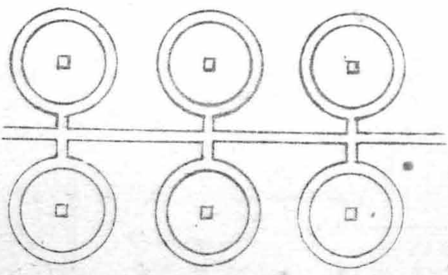

Fig. 9

Circular trenches connected by water channels.

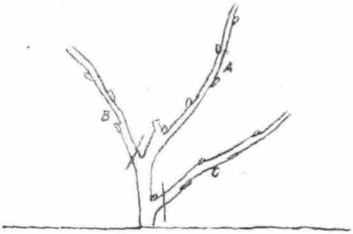

Fig. 10

The vine shown in Fig. 7, at the time of the first pruning after planting. If A is the strongest cane, it is retained and the others B and C cut away.

Fig. 11

The cane trained to a horizontal wire.

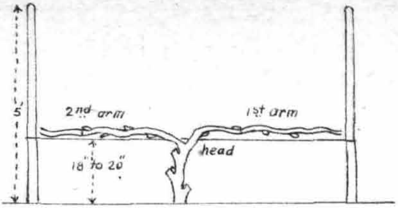

Fig. 12

*The same vine as shown in Fig. 11, with **a second arm or cane,** developed from a bud in the upper axil near the "**head,**" **trained** to the left.*

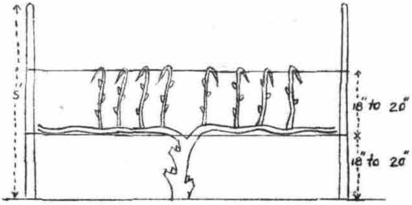

Fig. 13

Fruiting** canes of current season developed from **buds on the** arms, **trained** to a second wire 18" to 20" above **the first wire.

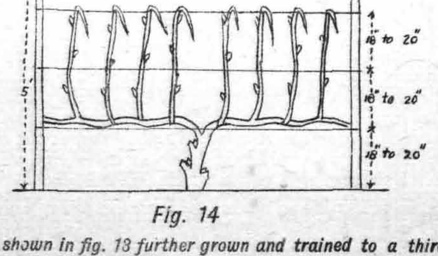

Fig. 14

*The canes shown in fig. 13 further grown and **trained to a third** wire 18" to 20" above the second.*

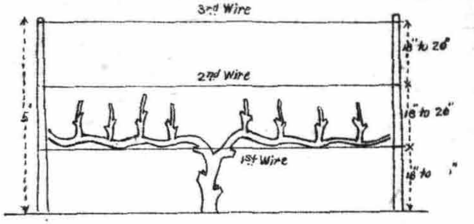

Fig. 15

The canes shown in Fig. 14 cut back to spurs bearing 2 eyes each; when these grow the stronger cane from each spur is retained to furnish the bearing cane of the next season.

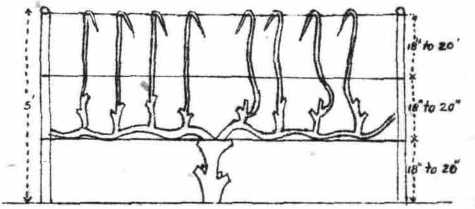

Fig. 16

A young cane from the stronger bud on each of the spurs shown in Fig. 15, trained to take the place of the previous season's fruiting canes shown in Fig. 14.

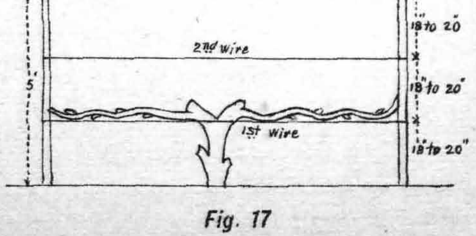

Fig. 17

The old arms shown in the previous figures are cut back to the head" and 2 buds near the "head" trained into new arms.

enough, should be drawn up vertically and tied on to another wire, batten or bamboo which is stretched across the posts at about the same distance from the lower one as this itself is from the ground. If the canes outgrow the second wire, they may be tied on to a third superposed above the second. More than three wires will not be necessary in common practice, the excess lengths of cane beyond the third being allowed to grow over and hang down (Fig. 14). The fruit of the season is borne upon the lower portions of the vertical canes and the principle underlying their pruning proceeds upon the facts that the canes which are formed in one season produce the bearing wood of the next season and that once they have borne fruit they do not bear again. Thus, then, no object is gained in retaining them any longer than after they have borne; therefore, after the vine sheds its leaves but whilst the buds are still dormant the canes should be cut down to short "spurs" or stumps each bearing 2 or 3 eyes (Fig. 15). In the following season, these give rise to as many new canes of which as before, all are cut away except the strongest which, in its turn, takes the place of the previous season's cane on the trellis (Fig. 16). Varying with its vigour, each fruit-bearing cane should be permitted to carry, in its lower part, only from 5 to 10 fruiting buds, all the other buds lying above these being carefully pinched or rubbed off. In course of time, the spurs that are annually left on the two arms will have elongated and interfered with the appearance and, possibly, also with the bearing condition of the vine. When this happens, the arms on the lowest wire may be shortened back to the head of the vine and two new buds trained out as arms to take their place (*vide* Fig. 17 and compare with Fig. 12).

7. *Care of Fruits*; *Yield*.—If the fruits set well, the clusters should be thinned by removing the smaller fruits so as to give more room for the development of the larger ones. This is done by clipping them off carefully with a pair of fine scissors. The fruits, as they approach ripeness, should be protected by soft cloth bags against birds, insects, fungi, frost and dust. They should not be cut before they are fully ripe, for the grape does not ripen after it is picked. In young vines, especially those of weakly growth, the number of bearing canes should be curtailed and the fruits themselves freely thinned.

From 10 to 15 pounds of marketable grapes is a fair average yield for a vine and, though 7,000 pounds per acre is a good yield, heavier crops may be often obtained.

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